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A STUDY OF MORPHOLOGY, PROVENANCE, AND MOVEMENT OF DESERT SAND SEAS IN  
AFRICA, ASIA, AND AUSTRALIA

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16. Abstracts  The assembling of photomosaics from color prints of ERTS images has made possible the recognition and description of sand patterns, and these are to be the basis of a worldwide classification of sand bodies. Progress has been as rapid as the acquisition of the bulk composite images will permit and for some areas the mosaics are now nearly complete. A second step, which consists of the accumulation and analysis of regional wind data, to be plotted as overlays for the dune patterns, is now underway and should soon give tangible results. Other aspects of the project include the gathering of ground truth in the form of airphotographs, needed to interpret geomorphic forms and the sampling of sand deposits for analyzing the texture and composition of sand bodies. A start has been made on these studies in several of the selected areas.				
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## Type II Progress Report

### ERTS-A

- a. Title: A Study of Morphology, Provenance, and Movement of Desert Sand Seas in Africa, Asia, and Australia

ERTS-A Proposal No.: SR 131

- b. GSFC ID No. of P.I.: IN 402

- c. Statement and explanation of any problems that are impeding the progress of the investigation:

The time lag between the placing of our orders for bulk color composite images and the receipt of these images is proving to be a real handicap because it delays completion of color mosaics and of all subsequent steps dependent on these mosaics, such as development of wind direction overlays and preparation of thematic maps of dune trends.

- d. Discussion of the accomplishments during the reporting period and those planned for the next reporting period:

Sand patterns which constitute the basis for a fundamental classification of dune deposits have been recorded and plotted for most of the areas under study and will be used in the preparation of thematic-type maps. Recognition of sand patterns as complexes of specific dune forms that reflect types of internal structure, is possible when ground truth, especially in the form of air photography, becomes available. For some sand sites such as in Algeria and in parts of Australia and South Africa, the types of dunes responsible have already been determined. Distinctions between areas of active dunes and stabilized dunes, between dune bodies and interdune bodies, and between sand deposits and eroded sandstone masses are essential to the study and are being worked out from the ERTS images, especially the color prints.

d.--continued

The assembly of photomosaics for all sand areas under study was begun with black-and-white prints but later changed to color prints when these began to be available. The color prints have proved to be excellent for purposes of this project because of the ease with which sand is recognized and distinguished from other similar features. The photomosaics are nearing completion for some areas and for others are progressing steadily, <sup>they</sup> but/can not be finished until color coverage for all pertinent areas has been obtained. The completed mosaics will ultimately be excellent bases for thematic maps and for plotting wind data on overlays, especially when used in conjunction with the Air Force Aeronautical Charts at the same scale (1:1,000,000).

e. Discussion of significant scientific results and their relationship to practical applications or operational problems:

The inventorying and classifying of dune type morphologies have progressed considerably along the route outlined in the Type I Progress Report of March 1, 1973.

A trip to White Sands, New Mexico, for the purpose of obtaining ground truth was rewarding. Comparison of sand samples from dune and interdune areas showed marked differences in composition and texture. If these differences are characteristic of dune fields in general, information concerning them should help to explain contrasts in appearance on ERTS imagery of the two kinds of sand areas and permit interpretation of similar features in remote areas.

e.--continued

A tentative classification of sand sea morphologic types is developing steadily and about 12 principal sand sea types are now recognized in the geographic areas under examination. The elements of a tentative classification are, therefore, emerging. Direct comparisons can be made at exactly the same scale between elements of widely separated areas.

f. A listing of published articles, and/or papers, preprints, in-house reports, abstracts of talks, that were released during the reporting period:

- (1) McKee, E. D., Breed, C. S., and Harris, L. F., 1973, A study of morphology, provenance, and movement of desert sand seas in Africa, Asia, and Australia: Proceedings, 1973 Symposium on ERTS-1, NASA/Goddard Space Flight Center, Greenbelt, Md.
- (2) Harris, L. F., 1973, The use of photographic methods in contrast enhancement of ERTS images: Proceedings, 1973 Symposium on ERTS-1, NASA/Goddard Space Flight Center, Greenbelt, Md.
- (3) McKee, E. D., 1973, A study of morphology, provenance and movement of desert sand seas in Africa, Asia, and Australia [ABS.], in Symposium on significant results obtained from ERTS-1: NASA/Goddard Space Flight Center, Greenbelt, Md., p. 34.

g. Recommendation concerning practical changes in operations, additional investigative effort, correlation of effort and/or results as related to a maximum utilization of the ERTS system:

None

h. A listing by date of any changes in Standing Order Forms:

None

i. ERTS Image Descriptor Forms:

Attached

j. Listing by date of any changed Data Request Forms submitted to Goddard Space Flight Center/NDPF during the reporting period:

Attached